

FINAL Report – EAP 2015 – Insights & Ideas to Recalibrate Alexandria’s Environmental Action Plan and Eco City Initiative

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Alexandria’s Office of
Environment Quality and
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Commission

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1 Report Overview, Background and Scope

1.1 Recalibrating Alexandria's Environmental Action Plan (EAP)

In January 2015 the City of Alexandria's Office of Environmental Quality (OEQ) and Environmental Policy Commission (EPC) engaged the Alexandria campus of Virginia Tech's (VT) Urban Affairs and Planning Department to help revise and update the current Environmental Action Plan (EAP) adopted by the mayor and city council in June 2009. As he did for the inaugural Eco-City Initiative (2008-2009), **Professor Joe Schilling led the current project in conjunction with 8 graduate students from the fields of planning, urban design, and architecture** from his spring 2015 Sustainability Planning and Policy class. Metropolitan Institute (MI) research assistants Allen Grace and Jimena Pinzón also assisted in the report's synthesis, research, drafting and formatting.

In the fall of 2014 the EPC began to chart their process for updating the EAP per its directive that the **"EPC serve as the primary guardians of the action plan and [Eco-City] Charter to monitor, measure, and report on the implementation of the EAP and refine it as circumstances and conditions change."** The EAP also expressly charges the EPC and OEQ in the short term to identify top policy priorities and program actions. As further stipulated in the EAP, the EPC should update the EAP at least every five years and the Eco-City Charter (Charter) every ten years. During these preliminary discussions the EPC set forth its preliminary thoughts for updating the EAP. Based on a 2014 EPC Power Point presentation the table below organizes their comments according to EAP format observations and EAP implementation insights:

EAP Format	EAP Implementation
Build upon, expand, and improve upon the city's Eco City branding activities	Develop and convene more vehicles for educating city officials about the impending environmental challenges confronting the city and how the EAP/Eco City Charter can help
Make the EAP more user friendly and publicly accessible	Enhance the use of EAP in city of Alexandria policymaking and managerial decision making (budgeting, staffing, and cross department coordination, etc.)
Consider having fewer action steps	Examine ways for integrating the EAP and Eco City principles into the city's comprehensive and small area plans
Revise all EAP goals (existing and new) to be SMART (specific, measurable, achievable, results-focused and time bound)	Identify dedicated sources of sufficient funding for more effective implementation, such as hiring a full time Eco City Coordinator
Focus more on short to mid-range sustainability goals and action items (3 to 5 years out)	Leverage EPC and OEQ's Earth Day activities to increase awareness, seek p[public input and promote the EAP update process

A few EPC members felt strongly that while Alexandria has fostered significant accomplishments in the past five years, the city needs to significantly ramp-up its commitment to fulfilling the goals and objectives of the EAP. When examining the content and issues discussed within the EAP, the EPC noted several sustainability priorities that would be important to address in its next iteration:

- Adopting comprehensive approaches to pressing sustainability challenges related to emerging threats such as climate change, greenhouse gas emissions, energy and peak oil, and their influence on City operations and City residents and businesses.
- Adopting strategies and policies that cut across departments and address multiple sustainability principles, such as:
 - Establishing a fiscal policy that takes “green” sustainability into account;
 - Establishing a holistic decision making process for all City actions that considers environmental and human health issues (e.g., sustainability and/or health impact assessments);
 - Designating a sustainability coordinator to facilitate internal and external Eco-City activities.

Within city government, the Office of Environmental Quality (OEQ) staffs the EPC while overseeing the EAP and the city’s general Eco City efforts. In fact, the city manager in 2009 elevated the OEQ within the city’s management structure as a direct result of its efforts in successfully launching the 2008-2009 Eco City Initiative. With respect to the EAP, OEQ noted the city’s many accomplishments over the past six-plus years, such as the city’s consistent green ranking by the Virginia Municipal League, the adoption of a green building policy, the city’s support for closing down of the Gen-On power plant, and transportation improvements such as the Route 1 BRT, participation in Capitol Bikeshare, and new hybrid DASH buses. **To its credit OEQ has strategically leveraged the Eco City brand in difficult fiscal times for the city and has managed to move forward with many EAP action steps despite the loss of staff.** In reflecting on the past six years, while OEQ wished they could have done more, they are happy with what they have been able to get done during such a difficult period for the city.

In light of these two perspectives, Virginia Tech implemented the following four part work plan for the first half of 2015:

- Scan of Existing City Efforts: VT participated in a series of individual and group meetings with City staff and EPC members to better understand recent City and community successes in achieving some of the EAP’s action steps. VT professor and students previewed upcoming work plans related to EAP goals and action steps and discussed how City officials and staff currently use the EAP (and Eco-City Charter) in making program and policy decisions. Several students also met with local sustainability organizations, such as the Alexandria Emerging Technology Center (AETC), a new green intermediary, and interviewed sustainability staff from other cities, such as the City of Charlottesville, VA; Dubuque, IA; the City of Santa Monica, CA; Evanston, IL; the City of Norfolk, VA and Richmond, VA.

- Policy Brief Development: As discussed in more depth below, VT graduate students developed eight sustainability policy briefs that focus on topics covering multiple sustainability principles that have become pressing priorities confronting other cities and communities within the urban sustainability field. The policy briefs briefly discuss existing Alexandria City policies, plans, and programs, but also and equally important, offer the EPC and OEQ relevant examples from other communities that Alexandria could learn and adapt from.
- SWOT Analysis and Sustainability Gap Analysis: As part of this final report, VT prepared a SWOT analysis that examines the Strength, Weaknesses, Opportunities and Threats related to the EAP and the broader Eco-City Alexandria Initiative. This final report also discusses the feasibility of a sustainability gap analysis, curating the top ideas from the final student policy briefs recommendations, and offering suggestions about the format, process and content for updating the EAP.
- EAP 2015 Update Web Pages: After final review by the OEQ and EPC, VT will post its final report and student policy briefs on the Metropolitan Institute's Sustainability Planning Lab web site (www.sustainabilityplanninglab.com).

Shortly after launching this project, OEQ informed the EPC and VT that in light of recent budget constraints, the City Manager shifted the EAP update from fiscal year 2016 to fiscal year 2017; thus, the formal EAP update process would not start any earlier than the summer/fall of 2016. Despite this lag time of roughly one year, VT believes the following final report and SWOT analysis can provide important strategic guidance not only to the OEQ and the EPC, but to City officials and Alexandria residents as they begin the process of “renewing” their commitments to make Alexandria a more healthy, prosperous and sustainable community now and especially in the future!

1.2 Eco City Accomplishments and Actions 2009-2015

By adopting the [Eco-City Charter in 2008](#) and the [Environmental Action Plan \(EAP\)](#) a year later, the City of Alexandria began its journey to become a more sustainable and healthier community. **At the time Alexandria was one of the first local governments in the United States to formally adopt an Eco City Charter premised on principles of ecological sustainability.** Developed through a transparent community process under the leadership of the EPC and OEQ, the Charter's 10 core principles are designed to serve as the overarching sustainability guide for policymakers, city staff, and local residents.

Since 2009, the mayor, members of the council, and city staff have been invited to speak about Eco City Alexandria at statewide, regional and local conferences. The City has also won several environmental awards along with special recognition as a platinum level green local government (one of only nine municipalities) for 7 straight years by the Virginia Municipal League as part of

their Go Green Virginia certification effort.¹ In 2014 MyLife.com, a social aggregation site, ranked Alexandria the number one mid-sized green city among 189 other cities.

The EAP serves as the City’s everyday work plan to implement and achieve the vision and principles set forth in the Charter. The EAP consistent of 48 goals, 50 preliminary targets and 353 actions steps that span 20+ years. Over the course of the past 6 years city officials and staff, primarily led by OEQ and EPC, have accomplished many of the EAP’s short term action steps despite fiscal and staffing constraints. For example, in 2010 OEQ and EPC shared its first annual EAP 2030 progress report and in 2012 established a set of 20 environmental indicators—one of the many action steps called for in the EAP 2030. Below we discuss a few EAP highlights by following the Action Plan’s 10 categories (which are based on the Eco City Charter’s 10 sustainability principles).²

By the Numbers—Highlights from OEQ’s 2014 Eco City Progress Report

Air Quality	4 orange quality air days	0 red days for 2014 and 2013
City Government Green House Gas Emissions	35.6% reduction from 2006-14	Per capita reduction by 27.9% 2005-14
DASH ridership	9.2% increase since 2012	
Installation of Stormwater BMPs	19.4% increase 2013&2014	
Respiratory health complaints	56.6 reduction	
Solid waste recycling rate	48.8% in 2013	
City Electricity use	19% offset with renewable sources	

1.2.1 Land Use and Open Space

The Land Use and Open space section of the EAP contains the most total goals (53) of any section within the EAP. One of the city’s first major sustainability achievements was reaching the open space target to acquire 100 acres. Today the city has 103 acres while planners in the Parks and Open Space Department continue to search for opportunities to expand this number and explore new avenues for dedication of private land and joint use of public agency open space. The city has begun the process to update the city’s Open Space Master Plan.

¹ http://www.gogreenva.org/?/green_government_challenge

² Many of the examples in this section are derived from OEQ’s 2014 Annual Eco City/EAP Report as discussed in a city manager memorandum dated April 8th, 2015 from Mark B. Jinks, Acting City Manager, File #14-3835 and presented and accepted by the Mayor and City Council at their meeting on April 14th, 2015.

In 2009 the city reached another important milestone by adopting the city's first Urban Forestry (UF) Master Plan. This Master Plan helps boost local and regional awareness of the vital benefits that urban canopies can provide. Alexandria is one of only two jurisdictions in northern Virginia with urban forestry components within their comprehensive master plans. The UF Master Plan includes the recommended national goal of attaining 40 per cent tree canopy coverage. Through a variety of programs, primarily involving public lands, Alexandria has made incremental gains towards this all important goal. A recent tree canopy assessment found Alexandria was around 34 % coverage.

Since 1982, the City has been annually recognized as a “Tree City USA” community, as awarded by the National Arbor Day Foundation. In 2011 the City was also recognized at the Silver Level as a Walk Friendly Community – much to the credit of the Complete Streets policy that was adopted.

Annual invasive species removal projects are ongoing with nearly 40 acres of natural areas being restored in 2014 alone. These ecological restoration projects preserve the natural condition, and provide sustainability through their natural aesthetic beauty. The natural beauty of Alexandria is also preserved through the City's efforts to realize and that have exceeded the goal of attaining 100 acres of open space.

1.2.2 Water Resources

Alexandria has been able to develop, and implement water resource development plans along Cameron Run, Hunting Creek and Four Mile Run, while also taking into considerations of water resources within the Waterfront Plan. Additionally, the first privately funded stream restoration project was completed in 2010 along Strawberry Run.

Although not expressly directed by the EAP, the AlexRenew facility started undergoing multi-phased renovations in 2012 to help remove nitrogen from local wastewater—an important quarter quality goal of the EAP. Construction specifications required the use of green building techniques and resources and the utilization of sustainable processes during operation. In 2014, the AlexRenew facility used 10 per cent of its treated wastewater for non-potable purposes within its operations in place of potable water. This saved customers \$2.8 million dollars. It also used methane gas generated on site to offset energy needs.

Stormwater management continues to be a high priority for the city and the EAP. OEQ has been working diligently on clean-up activities for the Chesapeake Bay under new US EPA regulatory requirements. In addition to updating and strengthening the city's stormwater ordinance, the Virginia Department of Environmental Quality gave the city a \$1.75 million dollar grant to fund and enhance the City's treatment efficiency of stormwater while also improving the aquatic habitat of the Ben Brenman Pond. These resources will help the city achieve many of the stormwater goals and targets outlined in the EAP. In 2011 the City received the “Virginia Engineering Excellence Honor Award,” from American Council of Engineering Companies. This was received in recognition of the City's program to reduce inflow and infiltration in its sewer systems.

1.2.3 Air Quality

After years of regulatory and legal actions, **the permanent closure of the GenOn power plant in 2012 represent perhaps one of the single most important milestones toward reducing the area's emissions of greenhouse gases and other air pollutants.** At its peak, this outdated relic of a coal fired power station emitted 15,000 tons of sulfur dioxide, 6,000 tons of nitrogen oxides, 600 tons of PM10, and 2.5 million tons of carbon dioxide annually. The site, known as a brownfield currently needs to undergo and complete remediation and deconstruction. The Potomac River Green efforts are already envisioning a more sustainability community for the site.

In 2009, the City released two reports on air quality and emissions. The first report is the “Alexandria’s State of the Air Report: Past, Present and Future,” and detailed air quality improvements made by the City over the past 40 years. The second released report was the “Greenhouse Gas and Criteria Pollutant Emissions Inventory.” This report aims to record and inventory City government operations and citywide emissions estimates. In completing the GHG emissions inventory, the City received a Local Governments for Sustainability milestone award from ICLEI in 2010.

The City has also made improvements in abating second hand smoke. By 2009, 100 per cent of fast food restaurants and more than 92 per cent of full service restaurants in Alexandria were smoke free.

1.2.4 Transportation

After extensive public meetings and under the leadership of the city’s Transportation Commission, in 2008 the City of Alexandria adopted a new Transportation Master Plan element to its Comprehensive Plan. As a blueprint for existing and future transportation investment, this plan was integral in bringing about many accomplishments over the past several years. The King Street Trolley program was started under these conditions in 2008. In 2010, the service inaugurated five hybrid trolleys, and in 2012 the service merged with DASH and bought five more brand new low-floor hybrid electric trolleys. Monthly ridership and popularity has been increasing.

Capital Bikeshare is the nation’s largest Bikeshare program. Alexandria’s portion of the Capital Bikeshare program was established in 2012 introducing eight stations within the City limits. This program was extended in 2014 by adding an additional eight stations. Citizens utilizing Bikeshare reduce annual VMTs, incorporate bicycling into multi-modal transit, and reduce individual and community carbon footprints. The City has been designated a ‘Bronze Level’ Bicycle Friendly Community by the League of American Bicyclists for the years of 2009 through 2013. These gains in bicycling go hand in hand with the City’s commitment in providing complete streets.

As called for in the EAP, in 2011 the city adopted its first Complete Streets Ordinance which integrates cutting edge stormwater technologies with multi-model road policies. This ordinance allows for the safe transit of school children, elderly and disabled persons on City streets, increased access to exercise to abate contemporary sedentary lifestyles, and opening and enlivening City

streets as key public spaces. The ordinance fostered the establishment of much-needed dedicated bike lanes along King Street in 2014. Also in 2011, the City passed one of the first human scaled transportation plans.

Alexandria introduced the first dedicated bus rapid transit (BRT) service in the Washington, DC metro region in 2014. Service is provided between the Braddock Road and Crystal City Metrorail Stations in order to alleviate congestion problems along the busy Route 1 corridor. This is being funded primarily through the local governments and is designated as a key lever for the City's Energy and Climate Change Action Plan. The Alexandria Transit Company's (ATC) fleet of City hybrid-electric buses will surpass 50 per cent of total operating vehicles this year.

Already in 2015, the North Potomac Yard Planned Metrorail Station has been able to lobby City Council into approving a recommended Station site in addition to drafting and presenting an Environmental Impact Statement (EIS).

1.2.5 Energy

The City set out in 2008 to reduce energy consumption by 3 per cent each year. Through establishing the Energy Conservation Committee, the City sought to offset energy consumption through the purchase of renewable sources, and energy conservation projects. By 2010, the City was providing 4.1 per cent of its electrical needs through renewable wind energy sources. This achievement was recognized by the US EPA Green Power Partnership. In 2014 more than 19 per cent of the City government's total electricity use was offset or generated by renewable energy.

The City started to embrace solar photovoltaic systems in 2012. Funded from the DoE EECBG program, Beatley Central Library installed 180 solar panels converting sunlight into 42.3 kilowatts into electricity. The City also installed solar photovoltaic on the restrooms at Witter Recreational Fields, 40 panels on the roof of the main pump station at AlexRenew and on four new bus shelters.

The City in 2008 established the Energy Conservation Committee that is focused on reducing energy consumption within city operations.

1.2.6 Building Green

In 2008, the City designed and built US 250 million dollars of LEED Silver or better public building projects. A Green Building Policy was formally adopted in 2009 that requires all new commercial and multi-family developments to be LEED Silver or LEED Certified. In 2010, the City achieved LEED Gold Certification on both the Charles Houston Recreation Center and the DASH Administration Facility. Alexandria Station was inaugurated as the first hybrid (not mixed-use) building that incorporated LEED and Earth Craft development standards.

By the end of 2010, the City had developed over 3 million square feet of certified green building 'projects,' which is approximately 95 per cent of all approved development. The integration of green building into historic preservation culminated in an adopted Modern and

Sustainable Materials for Historic Buildings Policy. Also during 2010, the City partnered with ACPS to complete the green roof and monitoring camera at Cora Kelly School. The green roof was installed to reduce energy consumption and stormwater generation, improve water quality, and serve as an educational tool for water cycle and stormwater management information. The data could serve as the basis for future indicator metrics.

In 2012, the Green Building Policy was still ensuring that new developments commit to obtaining a minimum level of green building certification. Highlights of developments during the year include the mixed-use development at Landmark Gateway, the Giant in Potomac Yard, Jefferson Houston School, IDA in Potomac Yard, and the Eisenhower Avenue Fire Station.

As of 2014, the Eisenhower Fire Station 210 (FS 210) is expected to certify LEED Gold this year. LED lighting retrofits were also carried out in 2014 at the Beatley, Duncan and Burke Libraries, the Chinquapin Recreation Center, the Ramsay House, the Black History Museum, and the Lyceum. Nearly 100% of all new commercial develop approved in 2014 committed to green building standards.

Additionally in 2010, several energy projects were completed at area schools. Minnie Howard's renewable energy HVAC system is now online resulting in a 39 per cent drop in energy costs. John Adams is underway with a sustainable remodel and expansion with LEED Silver projected. James K. Polk, upon completion, will exhibit the first ground to air heat exchange commercial system in North America and should register LEED Gold.

1.2.7 Solid Waste

Solid waste has seen many improvements over the past several years. The first improvement was the rebranding to the Resource Recovery Division. The simple verbiage alone shows commitment to sustainability measures and progressive thinking the City has enacted in order to tackle solid waste challenges. Solid waste disposal is decreasing in the City as recycling rates are setting and increasing annual records. **The recycling rate for 2013 was at 48.8 per cent.** This is due in part to transforming the program to single stream, setting up food waste recovery stations, testing a 32 gallon trash receptacle pilot program, the doubling of public recycling containers, separately disposing of yard waste, and installing trash and recycling compactors at T.C. Williams High School. Coincidentally, recycling rates doubled at City schools between 2009 and 2010.

In addition to piloting the smaller trashcan initiative the City delivered 19,000 new larger blue recycling containers in 2010. These larger containers allow residents to recycle more materials with ease and convenience. The City also extended the hours of operation for the Household Hazardous Waste Collection Center. This helped to securely dispose of 38,000 gallons during 2012. In light of these successes, the City has increased its recycling targets to be 65 percent of materials by 2020.

1.2.8 Global Climate Change and Emerging Threats

Preparing the city and its residents for the national, regional and local impacts of the world's changing climate remains an ongoing challenge. Since the 2009 adoption of the EAP, the effects of climate change have become more real and the science around its potential impacts have become more concrete. As a cross-cutting sustainability issue, many of the actions already highlighted in this section will directly or indirectly influence the city's climate change mitigation and adaptation activities. For example, **improving stormwater infrastructure will help mitigate flood risks and the shutting down of the local coal-fired power plant and replacing it with cleaner fuels will make a significant contribution to reducing GHG emissions.** The city's ongoing energy efficiency actions for city operations and its green building policy also have an impact on GHG emissions as a major driver of climate change. In addition to finishing the city's first GHG inventory, perhaps the most visible climate change action was the integration of flood walls as part of the city's Waterfront redevelopment plan.

1.2.9 Eco City and EAP Implementation and Outreach Activities

A hallmark of Eco City is Alexandria's on-going commitment to environmental education and community outreach. Since 2008, Alexandria has held numerous stream cleanups, rain barrel workshops, Eco-City Cafés, Earth Day celebrations, and the original Environmental Summit at TC Williams in May 2008. Additional outreach and educational activities include a home energy audit workshop, a Green Building forum, and a Garden School "Green Garage: Sustainable and Earth-Friendly Solutions for the Landscape," all in 2009. In 2010 the City started tree planting and invasive plant species removal, hosted an Eco-Friendly Restaurant Expo all while planting 550 City trees on streets and parkland.

In 2009 the original EAP called for the city to establish a more robust tracking and performance measurements.³ In 2012, the OEQ working jointly with the EPC developed 20 environmental indicators that can be measured on a routine basis to quantify the progress made on Eco-City Initiatives. It is noted that the inclusion of the public is essential in improving standards within the City.

The Office of Environmental Quality (OEQ) started releasing annual report cards to include a list of the indicators, targets and baselines as per centile changes. The Office of Performance and Accountability (OPA), established in 2012, released the City Manager's Performance Plan for FY 2014-FY2016 utilizing four focus areas and aligning to the City's Strategic Plan. An excellent example of a successful indicator project would be at looking at Alexandria's Community Health Improvement Plan (CHIP) that was developed with help from the Alexandria Health Department.⁴

³ Pinzon, 1.

⁴ Pinzon, 1-3.

1.3 Student Policy Brief Process

Throughout the 2015 spring semester, graduate students in the Sustainability Policy and Planning Class, with guidance from Professor Schilling: 1) Reviewed and assessed the 2009 EAP within the context of the overall Eco-City Initiative and Charter; 2) Identified examples of sustainability policies and programs from other cities relevant to Alexandria, and 3) Made short and longer range recommendations to help guide the EPC on the update of the EAP. Each student focused on one of the following topics:

Sustainability Policy Briefs	Student Researcher
Climate Change Preparation, Adaptation and Mitigation	Zach Krohmal
Urban Greening (Urban Forestry, Open Space, Green Infrastructure)	Allen Grace
LEED-ND and Eco Districts	Brigita Stavreva
Community Energy Planning and Green Building Policy	Judith Johnson
Transportation, Housing and Land Use	Adam Watson
Financing Sustainability	Alan Cunningham
Sustainability Tracking, Indicators and Report Cards	Jimena Pinzón
Sustainability Coordination, Communication and Outreach	Chuck Egli
All student policy briefs can be found at www.sustainabilityplanninglab.com	

The policy brief topics reflect priority issues in the field of urban sustainability that have emerged since adoption of the EAP in 2009; they also have special relevance for addressing pressing city and community priorities and have potential for helping the city, EPC, and its partners move the Eco City agenda forward. Some of these topics directly address principles, goals and action steps from the existing EAP (e.g. urban greening), as well as new and overarching themes in the field of urban sustainability (e.g. Financing the EAP, Sustainability Coordination, Communication and Outreach, and Sustainability Tracking, Indicators, and Report Cards).

The students assessed the existing EAP by reviewing its long range and short term actions, the Eco-City Charter as well as other relevant City documents (e.g. the city council's Strategic Plan, master plans, Small Area Plans). City documents were obtained from the City's website. Students also held several conversations with EPC members and City staff by phone and via email.

After the assessment, students identified relevant examples Alexandria can adopt and provided short-, medium-, and long-term recommendations for the City and EPC to consider for the next iteration of the EAP. Students identified relevant programs and policies through web searches, phone interviews with other cities' staff as well as non-governmental organizations (NGOs). The students used as a baseline the Compendium of Model Sustainability Practices, prepared by Virginia Tech students in 2008, as well as recommendations provided by EPC members and other City staff.

The results of this class exercise are summarized in the on-line abstracts and complete student briefs. Each of the 8 policy briefs range in length from roughly 15 to 35 pages. The abstracts and briefs can be found on VT's sustainability planning website (www.sustainabilityplanninglab.com).

Students also presented the results of their policy briefs at the April 4, April 18, and May 4, 2015 EPC meetings that were hosted at the National Capital Region Campus of Virginia Tech, located off of Prince Street in Old Town, Alexandria. EPC members and OEQ staff provided valuable feedback to the students about the scope, scale and framing of their policy briefs and recommendations to ensure they were more relevant for the City of Alexandria.

2 Sustainability Impact Assessment

2.1 Sustainability Impact Assessment and Ecological and Carbon Footprinting

During discussions with the Environmental Policy Commission (EPC), several members noted that the current EAP 2030 does not: 1) discuss in depth the current and future environmental challenges confronting the city or 2) document/quantify the sustainability impacts that flow from existing and future policies, programs, and projects adopted and implemented by the City of Alexandria. What are the sustainability impacts from existing lifestyles and businesses—how we live, work and play today on future generations?

Without more data and information, the City cannot accurately gauge whether its entire Eco-City Initiative has sufficient resources and staffing to match the scale of existing and future environmental challenges as well as prioritize investments in ecosystem services. Moreover, when Alexandria policymakers make future infrastructure or development decisions, they do not have a comprehensive tool or process that can assess the interplay of potential social, environmental, and economic costs and benefits.

RECOMMENDATION: The Mayor, City Council and City Manager should adopt a process for assessing the sustainability impact for major development and policy decisions.

Conducting a sustainability impact assessment would provide a new long-range tool that can determine how existing or proposed policy or program interventions might positively or negatively impact the city's goals to become a healthier, sustainable and just community. When measured against baseline data such an assessment process could help the city more accurately set and achieve many of the longer range targets set forth in the current EAP. For example, if the city adopted more aggressive urban forestry efforts to exceed the proposed 40% crown coverage goal, what positive impact might that have on the city's greenhouse gas (GHG) emissions? They would also be able to estimate the long-range capital costs for expanding green infrastructure which in turn would provide data to make the policy and political case for developing new forms of capital improvement financing to support urban forestry and green infrastructure expansion. Sustainability impact assessments would also complement scenario planning in light of other

critical environmental challenges, such as sea level rise on the Potomac from the most recent climate change data (See student policy brief by Zach Krohmal).

Within the field of urban sustainability, more local governments are using different tools and processes to assess their sustainability impact from greenhouse gas emissions to carbon footprint analysis.⁵ With increasing concerns over climate change, Greenhouse Gas Inventories have become a common approach to provide a snapshot of greenhouse gas emission from city operations as well as from local residents and businesses within the jurisdiction. National organizations such as ICLEI have developed standards for conducting these inventories while others, such as STAR Communities, focus on integrating the data into a performance-based plan, GHG inventories, however, typically give communities only a snapshot in time and tend do not necessarily account for a broader set of socio-economic impacts.

A classic assessment framework—ecological foot-printing—quantifies the supply side of natural resources and natural capital assets that support a broad range of human consumption activities. At the city level about a dozen studies have been conducted and completed in North and South America, Europe and Australia by the Global Footprint Network.⁶ In the United States, the ‘Ecological Footprint analysis: San Francisco-Oakland-Fremont, CA’⁷ and the ‘Report on the Sonoma County Ecological Footprint Project’⁸ provide concurrent methodologies, context, and visual representation of inputs and outputs.

Another assessment tool—carbon foot-printing—examines carbon usage from human outputs. EF studies can be tailored towards the community level that help reduce environmental impact, as the Sonoma County EF report that helped foster the reduction of carbon dioxide emissions by 20 percent.⁹ The City of Petaluma was able to select a more appropriate sewage treatment option based on EF studies,¹⁰ and Vancouver, BC relied on its EF study to include feasible and attainable carbon reduction rates of baseline values by 33 percent in 2020 and 75 percent by 2050.¹¹ This is directly related to Alexandria’s goal of becoming carbon neutral by 2030.

2.2 Sustainability Impact Assessment in Alexandria

Although Virginia Tech did not have sufficient time or resources to conduct its own sustainability impact assessment of Eco City Alexandria, below we outline different paths the city could take as

⁵ For more information about ecological footprint analysis and carbon footprint analysis, please consult Appendix 7.4 to this report posted on VT’s [Sustainability Planning Lab](#) web site.

⁶ Global Footprint Network, *Case Stories*, March, 2015, http://www.footprintnetwork.org/en/index.php/GFN/page/case_stories/#cur (accessed June 6, 2015).

⁷ Global Footprint Network, *Ecological Footprint analysis: San Francisco-Oakland-Fremont, CA*, June 2011, http://www.spur.org/sites/default/files/migrated/anchors/Ecological_Footprint_Analysis.pdf (accessed June 6, 2015).

⁸ Sustainable Sonoma County, *Report on the Sonoma County Ecological Footprint Project*, May, 2002, <http://www.sustainablesonoma.org/projects/footprintreport/scfpweb.pdf> (accessed June 6, 2015).

⁹ Mark Roseland, *Toward Sustainable Communities: Solutions for Citizens and their Governments*, (Canada: Mark Roseland, 2012), 25.

¹⁰ Ibid.

¹¹ Ibid.

interim actions. **A good starting point is refining and expanding its current Eco-City indicators effort.**

Students identified a few data sources that could shed light on some of the EPC's questions about the city's most pressing environmental challenges (see table below). Data on trends or potential environmental impacts was found in various individual reports maintained or commissioned by different departments; for example, the city's Climate Action Plan contains data on existing GHG emissions from city government use. Below is the preliminary list of potential data sources EPC and city officials can use as a starting point; however, it is important to keep in mind that indicators need to be selected after goals have been established (See student policy brief by Jimena Pinzón).

Parameter	Source
Vehicle Miles Traveled (VMT)	VDOT (http://www.virginiadot.org/info/2014_traffic_data.asp)
Health Data	County Rankings http://mddnr.chesapeakebay.net/eyesonthebay/index.cfm
Water and Air Data	Metropolitan Washington County of Governments http://www.mcog.org/environment/
Water	Chesapeake Bay and NOAA
Bike Ridership	Complete Streets Program
Open Space and Accessibility to these Areas	City's Park Planning
Walkability	Walk Score and GIS Department
Miscellaneous Data	GIS Department
Greenhouse Emission Conversion	EPA http://www.epa.gov/cleanenergy/energy-resources/refs.html

Unfortunately many of these existing data sources do not necessarily have specific data on Alexandria's sustainability impacts; thus, OEQ and EPC would likely need to create processes for collecting and synthesizing Alexandria specific data. We recognize that gathering data on the carbon or ecological footprint of its residents may take time and additional resources. As the city continues to infuse new performance measures within city operations, this may be a good opportunity for pilot testing a list of key performance indicators that can track sustainability impacts over times.

Another place to start is a comprehensive content analysis of various long range plans provided by other city departments and government agencies (e.g., Alex Renew, ACPS, Northern VA Regional Commission, etc.) to determine projections for population increases, population density, employment, local/regional GDP, school enrollment, etc. Each of these data points could serve as a baseline for calculating various measures, such as energy/carbon emissions per capita.

RECOMMENDATION: Inventory and synthesize existing national, regional, and local data sources that track relevant sustainability trends.

RECOMMENDATION: When OEQ and the EPC launch the official EAP update in 2016, they should commission a comprehensive inventory/sustainability impact assessment of the policy, data, and budgetary gaps between existing Eco-City efforts and proposed actions under a new EAP.

RECOMMENDATION: Alexandria should also explore directly linking an ecological or carbon footprint analysis to its Environmental Action Plan (EAP) and eventually to the City Council's Strategic Plan and its Comprehensive Plan (AKA Master Plan).

Ecological and/or carbon footprint analysis would establish a baseline for consumption data and provide annual measurements against that baseline in order to track progress or regression. These EF/CF studies could work in tandem with current efforts by the Office of Performance and Accountability (OPA), the emerging Alexandria Geographic Information Systems (GIS) Data Portal, and the City's Socrata dashboard, which is currently under development.¹²

EF and CF studies would also provide the city with an integrated approach to see macro-level consumption rates that affect the economy, society, and the environment. The City already collects relevant data for these studies including per capita energy use, solid waste recycling rates, and per capita water use.¹³ In order to realize an EF or CF study, the City would likely have to either collect the remaining data and/or formalize the findings in a report and/or hire a local university or other 3rd party contractor, in order to produce usable results that could be tracked over time.

Such studies could be used to benchmark Alexandria with other cities and national entities in terms of how many global hectares (gha) the average citizen requires in order to live. This approach would also empower the City to develop programs and policies that reduce civic consumption of materials, and goods or services.

Alexandria's EF could influence supply and demand side economic decisions. On the supply side, for example, planting a tree under the street tree program would increase carbon sequestration and provide ecological services or credits to the city. Demand side economics could also help the city reduce its EF by the simple example of increasing the frequency, amount, and usage of farmers markets within the city. This would promote locally grown grocery options and a smaller EF as opposed to denizens shopping at large scale commercial supermarkets that produce larger EFs.

3 Alexandria's Planning Foundation

Throughout this project and assessment process, Virginia Tech raised questions about the City's planning framework and its relationship (if any) to the EAP and Eco City Charter. Alexandria has a robust planning history and civic engagement framework through its numerous boards and commissions and neighborhood/citizen associations. Most of the city's recent planning efforts have focused on updating a few elements of its comprehensive plan (called the Master Plan) and revising its extensive network of Small Area Plans (SAP). Other city boards, commissions, and "ad hoc"

¹² Jimena Pinzón, "Tracking, Indicators and Report Cards," 6-7.

¹³ Ibid., page 4.

committees also produce their own “master plans” that may directly address sustainability and land use planning issues but appear to have little “formal” connections to the city’s comprehensive plan. By not having an express or direct link to the city’s comprehensive plan, these ancillary plans and policies do not appear to have much legal and/or policy strength and thus, can be more easily ignored or overruled over time.

As the OEQ and EPC move forward in updating the EAP, the VT team thought it was critical to explore Alexandria’s planning framework and compare it with other jurisdictions in Northern Virginia. Hundreds of cities across the nation (and the world) have adopted sustainability chapters with their comprehensive plans, while a few have completely written their compressive plans to become a new breed of sustainability plans.¹⁴ The next sections of the report analyzes Alexandria’s planning framework and offers several ideas and recommendations for potential actions OEQ and EPC could take in collaboration with the city’s Planning Department and Planning Commission in order to leverage the core principles of sustainability found in the Charter and EAP.

3.1 Alexandria’s Master Plan Framework and Analysis

Virginia Code § 15.2-2223 to § 15.2-2232 require municipalities to develop and adopt a *comprehensive plan* in order to plan for future land use, transit options, housing, and other long to mid-range planning issues. The required elements or chapters within a comprehensive plan include provisions for a transportation plan, transportation maps, an affordable housing component, and long-range recommendations.¹⁵ All other aspects of a Virginia certified comprehensive plan are supplemental, and not required by state law. These comprehensive plans and chapters are required to be reviewed at least once every five-years.¹⁶

Alexandria’s current comprehensive plan, actually entitled the ‘Alexandria Master Plan,’ contains citywide chapters (or elements) and eighteen Small Area Plans (SAPs). As of August 2015 every other municipality within Northern Virginia, except for the Towns of Clifton and Leesburg, has adopted a plan that is designated as a ‘Comprehensive Plan.’ In Alexandria the planning terminology seems confusing to call its comprehensive plan a “Master Plan” because the city also has a number of secondary master plans that are not technically part of the city’s comprehensive plan. (For purposes of this report we will designate Alexandria’s comp plan as the Master Plan in capital letters with the other plans in lower case). **We also found it hard to determine whether or not these minor “master plans” have been formally adopted as elements or even amendments to the Alexandria Master Plan;** for example, Alexandria has the Dog Park master

¹⁴ For more information about the explosion in sustainability planning please consult the Metropolitan Institute’s [Sustainability Planning Lab](#); see also ICMA article by Schilling and Desouza on [Local Sustainability Planning](#).

¹⁵ §15.2-2223. Comprehensive plan to be prepared and adopted; scope and purpose, 2015, <http://law.lis.virginia.gov/vacode/15.2-2223/> (accessed July 8, 2015).

¹⁶ § 15.2-2230. Plan to be reviewed at least once every five years, 2015, <http://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2230/> (accessed July 8, 2015).

plan and the Four Mile Run master plan among others that do not appear to have any formal relationship to the city's comprehensive plan.

Since its adoption of the current Master Plan in 1992, the City has not undertaken a comprehensive review, rewrite and update. However, **the City has regularly added and updated chapters and incorporated Small Area Plans into its Master Plan.** The Alexandria Master Plan's Land Use chapter, also untouched since 1992, does not include any literature or recognition of such contemporary planning principles as sustainability, resiliency, and climatic change mitigation. Both the Open Space and the Recreation, Parks and Cultural Activities Master Plans have not been updated since their adoption in 2002. In light of demographics, market, and policy shifts since 1992, it would seem that Alexandria could benefit from more comprehensive updating of its Master Plan.

Perhaps the most challenging task for the Virginia Tech team was determining the City's planning landscape from researching Alexandria's web site. For example, it was difficult to determine whether these and other *Tier 2 Documents* have any "formal" relationship to the City's Master Plan. It seems, for example, that the recent Bike-Ped master plan was adopted as amendments to the Transportation Chapter of the city's Master Plan, which would make it a more enforceable policy document. However, many of the other Tier 2 master plans appear to have little expressed connection to the City's Master Plan.

In Appendix 7.1, based on research and the inventorying of comparable practice Virginia Tech classified Alexandria's Planning Landscape into Three Tiers:

- *Tier 1 Documents* include Alexandria's Master Plan, which is inclusive of the citywide chapters, and all of Alexandria's SAPs.
- Tier 2 Documents include other master plans that are unconnected to the City's Master Plan.
- *Tier 3 Documents* include other important policies, guidelines and codes also not formally connected to the Master Plan. Examples of Tier 3 Documents include the Eco-City Charter, the Environmental Action Plan, the Zoning Ordinance, the Green Sidewalks BMP Design Guidelines, the Green Building Policy and the Complete Streets Policy.

RECOMMENDATION: City of Alexandria should develop a simple diagram and on-line guide that clearly explains the vertical and horizontal relationships among all of these Tier II and III city's plans and policies to the city's Master Plan. A good example for the city to adapt is the diagram of Planning Linkages found in [the Introduction of the Prince William County's Comprehensive Plan](#).

3.2 Northern Virginia Comparative Comprehensive Plan Analysis

As part of this analysis Virginia Tech compared Alexandria's Master Plan with the comprehensive plans of fourteen municipalities in the Northern Virginia area in addition to seven jurisdictions as

far south as Stafford County and as far west as Fredrick County. (See Appendix 7.2 and 7.3 for more detailed information and a comparative matrix of comprehensive plan elements or chapters).

Alexandria’s Master Plan contains the necessary and required chapters, while supporting additional chapters and initiatives. Each time the City adopts a new chapter, amends an existing chapter, and/or adopts a new small area plan or amends a small area plan, it complies with Virginia state law that requires local government to update their comprehensive plans every five years.¹⁷

Alexandria’s Master Plan has not undergone a comprehensive overhaul or update since 1992—the oldest comprehensive plan without a major overhaul within Northern Virginia.

Alexandria’s peer jurisdictions have undergone complete comp plan updates within the past two to nine years.

Given the sea changes within planning, development, and land use fields over the course of 20+ years, **it would seem that Alexandria policymakers, citizens, businesses and developers would benefit from undertaking a comprehensive update or overhaul of its Master Plan?** In examining the contents of the comprehensive plans from the Northern Virginia region there were a total of 23 different chapters or elements that went beyond the state requirements of including a transportation plan, transportation maps, an affordable housing element and long-range recommendations. For instance out of the 22 municipalities (inclusive of Alexandria) surveyed all but three jurisdictions had formal Land Use Chapters.

4 SWOT Analysis

A major goal for this project was to help prepare the OEQ and the EPC for next year’s EAP update. As a complement to the student policy briefs, the following SWOT analysis of the EAP’s content and format can help guide the City’s efforts to implement existing actions and set new ones. **The SWOT analysis examines the City’s overall Eco-City Initiative as well as the EAP because it is difficult to separate the two from each other.**

The SWOT analysis below looks at different aspects of the EAP, its relationship to other officially adopted policies and plans and the City’s capacity and commitment to put in place the numerous EAP action steps. As noted in the table below, a traditional SWOT analysis examines the respective **Strengths and Weaknesses** of an organization or initiatives. In this case the EAP and related plans, programs and policies. It also considers the role of various City departments, other agencies, and community based nonprofits engaged in the Eco-City endeavor by posing important questions, such as what have they done and how they could improve implementation of the EAP and Eco-City Charter. The SWOT analysis also discusses external drivers—the positive **Opportunities** that could advance the EAP and Charter along with the potential **Threats** that could hamper the City’s Eco-City Initiative.

Sample SWOT Analysis Questions

Strengths (Internal)	Weaknesses (Internal)
What are its assets, benefits and/or advantages?	What can you/your organization do to improve?
What do you/your organization(s) do well?	What is done poorly?
What have you accomplished?	What areas are not covered?
Opportunities (External)	Threats (External)
What are the opportunities facing you and your organizations?	What obstacles do you/your organization face?
What are the opportunities you might choose to pursue?	Are the requirements needed to address issues changing?
What trends can you take advantage of?	What is holding your organization back?

Source: adapted from <http://betterevaluation.org/evaluation-options/swotanalysis>

In compiling this SWOT analysis, VT leveraged its previous experience working with the City on the original Eco-City Charter and EAP along with its growing knowledge from the sustainability efforts of other cities. Many conversations were made with EPC members, City staff, and local citizens, which helped frame the context for this SWOT analysis. Several passages in this analysis stem from class assessments, dialogue between students and practitioners, and incorporating knowledge of other model practices from comparable jurisdictions.

RECOMMENDATION: *As part of the formal EAP Update process, OEQ and EPC should conduct a series of SWOT sessions with City officials, City staff and key stakeholders and residents to get their thoughts on the EAP and Eco-City's relative strengths, weaknesses, opportunities, and threats.*

4.1 Backgrounder on SWOT Analysis

Strategic planning can help organizations address complex internal management issues and enable communities to address intricate external policy problems. A good strategic plan can help organizations identify trends and prepare for change. A good strategic plan can also provide a roadmap for achieving a vision that often requires wise decision-making and strong leadership.¹⁸ Strategic plans typically set broad goals with more specific objectives along with different action plans that target resources, staff, and programs to specific activities or places consistent with the organizations overall vision and mission.

¹⁸ Herman, Robert D. and Associates, *The Jossey-Bass Handbook of Nonprofit Leadership and Management*, (San Francisco: Jossey-Bass Publishers, 1994) 154-163.

The City of Alexandria’s 2010 Strategic Plan, along with the 2008 Eco-City Charter offer a good foundation of sustainability goals and principles. In fact, the Strategic Plan’s environmental section uses common sustainability language and terms. Collectively the city’s Strategic Plan encompasses the environmental, economic and social dimensions of sustainability. The Charter, on the other hand, goes even further by defining the essence of ecological sustainability and offers a vision of sustainability tailored for Alexandria’s unique assets and historic characteristics. The EAP attempts to translate the sustainability vision and principles into concrete policy and programmatic actions over the course of short, mid- and long range time horizons.

One of the first steps in the process of developing or revising a strategic plan or action plan is the evaluation of internal capacity and external dynamics. A common method for completing this assessment is to perform a *SWOT Analysis* that evaluates an organization’s *Strengths, Weaknesses, Opportunities, and Threats*.

- Strengths and weaknesses assess internal capacity, such as the organizational processes or the fiscal constraints of the environment within which the organization is working; organizations typically have the most control over these internal challenges. Resources, process, and performance measures are useful for evaluating and addressing strengths and weaknesses.¹⁹
- External dynamics, the source of opportunities and threats, are often the most influential set of variables but an organization may have little control over them. While threats are more likely to receive attention because of their perceived interference, it is equally important to recognize and capitalize on opportunities.

4.2 Strengths and Weaknesses of the Eco-City Alexandria Initiative and EAP

Alexandria’s Mayor and City Council set a new course of ecological stewardship and progressive green policies when they unanimously adopted the Charter in 2008 and the EAP in 2009. These pioneering documents illustrate Alexandria’s preliminary awareness about the interrelationship of urban sustainability principles and the actions and measures necessary to supports the triple bottom line of economic vitality, social equity, and environmental stewardship. As such, a number of City officials, staff, and citizen commissioners have leveraged the Charter and EAP as a catalyst for a number of City programs and policies as well as for raising environmental awareness with the general public.

The first half of the SWOT analysis reviews the strengths and weaknesses of these two documents while looking at the broader suite of Eco-City Alexandria Initiatives and programs set forth in the EAP itself. The second half of the SWOT Analysis discusses the immediate and longer term opportunities facing the City and the region as well as broader external threats that might create obstacles to Alexandria’s efforts in becoming an Eco-City.

¹⁹ Ibid.

The recommendations below have been curated from many conversations with City staff, EPC members and the general public, as well as referencing other cities that have advanced their sustainability policies and practices since the adoption of Alexandria’s Charter and EAP.

4.2.1 The Charter and EAP

When compared with other cities of similar size and geography, the Charter and EAP set Alexandria apart from its peers—these documents in their own right are a strength the city and EPC must build upon. As a guiding document the Charter serves as the foundation for individual and community level sustainability initiatives. Alexandria’s 2004-2015 Strategic Plan is also sprinkled with sustainability concepts and principles but it remains unclear how the Eco-City Charter, if at all, connects to the Strategic Plan. **Outside of the Charter and EAP, few official City policies, plans, and programs mention sustainability or expressly refer to Charter’s vision and guiding principles.**

RECOMMENDATION: City officials should more clearly articulate and promote the relationship of the Charter and EAP with other City programs, especially the city’s Master Plan and Small Area Plans, and attempt to infuse the Charter’s sustainability vision and principles throughout city programs and policies.

When it was first adopted, the EPC envisioned the Eco-City Charter and EAP as being the overarching documents that would facilitate coordination and collaboration across City departments. Unfortunately, the Eco-City Initiative more broadly and the EAP more specifically often competes with other policy and political priorities. Many of the city departments have their own commissions that develop their own “master plans” and thus departments focus and follow their own plans first. In much the same way many other departments seem to view the EAP and Eco-City as the primary domain of T&ES and OEQ.

In light of the city’s rough fiscal times of the past 5+ years, there has not been sufficient internal and external support to tackle the EAP’s extensive goals, targets and action plans. Despite these obstacles, the city has made incremental progress in accomplishing many, if not most of the EAP’s short term action steps. **The EAP’s most important weakness is the mid and longer term goals** as those goals often demand adoption of more aggressive policies, some might require state legislation, and additional resources. As discussed in the sustainability assessment section of this report, the EAP also does not describe, let alone prioritize, the environmental current or impending threats facing the City.

The current EAP also serves different purposes for different users and audiences. For example, it appears that the OEQ uses the EAP as an internal worksheet to track performance, set internal work plans and also raise environmental awareness with City officials and the community. **In many ways the OEQ acts as the EAP’s Program Manager and Performance Tracker.** They seem fine with the EAP’s current format including a large number of goals, objectives and action steps.

Throughout this project the EPC expressed their concerns about what they consider to be a large number of action steps, especially those mid-to-long range action steps and targets that would

require significant policy changes, additional resources, and major investments of political capital and leadership. Without these policies, fiscal and political commitments, the EPC appears to prefer a new EAP with fewer goals so that the goals set forth are more practical and achievable within a shorter time frame, being accomplished within three to five years.

Certainly the size of current EAP can make it difficult for City officials and City staff outside of the OEQ and the general public to build consensus around priorities and provide the necessary resources and political support. The strength in moving forward for the City is to learn from the first iteration of the EAP and leverage that knowledge into producing a more focused and succinct second iteration.

RECOMMENDATIONS: OEQ and EPC should explore other possible formats and processes when it updates the EAP in 2016, for example:

- *Longer range goals could be moved to the Eco-City Charter or noted in the preamble of the EAP*
- *EPC and OEQ might develop an annual list of “priority” action steps (e.g., a top ten list) that could be used to inform the city managers budget process each fall.*
- *Perhaps break longer-range goals into more precise short or mid-range goals and acting upon those in a phased or modular format to incrementally accomplish these long-range goals and targets.*

4.2.2 City Wide Eco-City Initiative vs. Environmental Action Plan—Who Owns Eco City?

Since the adoption of the Charter and EAP, City officials have leveraged the Eco-City Initiative to launch a number of transportation, energy, and community driven environmental and planning projects. Eco-City provided a galvanizing force around the shutdown of the GenOn Power Station, brought and expanded Capital Bikeshare, helped deliver the Metroway Bus Rapid Transit (BRT), offset City government energy consumption with renewables by 20 per cent for fiscal year 2014, and led to single stream recycling initiatives. **Despite these accomplishments it remains unclear on who owns the Eco-City Initiatives.** EPC and OEQ are perhaps the most visible owners but they each have somewhat different interpretations of the scale and future direction of Eco City and the EAP. As discussed below it does not appear there are many political, business or community champions who have a strong sense of owning Eco City. Many local leaders support and endorse Eco City as one of many important policy priorities for the city, but do not seem to fully appreciate Eco City’s core sustainability principles.

OEQ’s ownership as the primary steward of Eco-City and the EAP within City Hall is perhaps one of the more enduring characteristics of the EAP. At one time OEQ convened a regular cross departmental working group (The Environmental Coordinating Group) around pending programs and plans that required input from multiple departments and agencies. In light of past and recent political and managerial changes, it remains unclear if a vocal and strong champion for Eco-City will emerge. Many City officials and City staff seem to have adopted the OEQ’s framing of Eco-City as predominately an environmental initiative instead of an overarching organizing concept. The EPC’s

perspectives on sustainability and Eco-City also appears unclear as most members of the EPC understand the broader concepts of sustainability but feel they cannot tackle those issues outside of their environmental responsibilities set by the City. The EPC and OEQ cannot effectively achieve the EAP's many targets and action steps without having more partners within city hall and sharing ownership of Eco City and the EAP.

RECOMMENDATIONS: Perhaps it is time for EPC and OEQ to revisit the Eco City Charter and spend time promoting its vision and principles within and outside of city hall as a way to reinvigorate community wide interest and ownership in the EAP update and spirit of sustainability.

4.2.3 Eco-City Branding, Website, and Outreach

The Eco-City logo and branding of activities has been nothing short of remarkable. The Eco City logo as the most visible symbol of the initiative can be seen on buses, blue recycling cans, and in and on other city and public property. The annual Earth Day celebration remains a huge community success thanks to EPC and OEQ's leadership. The City also hosted for the first time the US EPA's P3 National Sustainability Design Expo which features sustainability designs from colleges throughout the country. As mentioned before, the Eco-City Initiative helped spawn the City's Climate Action Plan (CAP), the adoption of a Green Building Policy, and other sustainability programs and projects. Both the Charter and the EAP provide the EPC and OEQ with a certain level of credibility as together they spearheaded the creation and adoption of the Charter and EAP.

As a result of these and other activities a certain segment of the community have become loyal Eco City supporters, however, in order to take Eco City to the next level it must **reach more citizens and expand its partnerships with new organizations and businesses.**²⁰ Economies of scale dictate that the more residents and businesses that understand and support Eco-City's actions, such greater demand for green practices and projects will make it easier for the city to attract those types of businesses and green investments. The more people that buy into Eco-City will also make it easier for the City to obtain certain benchmarks or thresholds in progress towards becoming a more sustainable community—essentially living up to the expectations bestowed on the city from its various awards and accolades.

In this age of social media and the internet Eco City's best calling card remains Alexandria's Eco-City website. Currently the web site provides information about upcoming and past eco city activities, however, the Eco City page is buried deep within the city's web site. Moreover, the web site overall is hard to navigate and seems out of date compared with contemporary web sites from other local governments—it needs more graphics and dynamism! The Eco City page outlines its 'Top Ten Environmental Achievements for 2014,' but does not frame the issues or make the case as to WHY citizens should support Eco City. It does not visually provide guidance or offer tips, for example, on how citizens might reduce their carbon footprints or volunteer for stream cleanups.

²⁰ For an excellent discussion on how the city of Alexandria can improve its sustainability outreach and communications, see student policy brief on sustainability coordination by Chuck Egli.

RECOMMENDATION: In looking forward to the EAP update starting in the fall of 2016, the city should consider reinvigorating the Eco-City Brand, re-launching a new website and engaging in more cohesive social media campaign that explains WHY people should support Eco City policy actions and neighborhood activities.

Eco City needs a larger constituency among local residents and organization.²¹ Many citizens are not incentivized to go beyond Earth Day celebrations and turn that sustainability into something concrete, permanent, local, and desirable. As sustainable thinking becomes more ingrained mentally, communities will find it easier to adapt to climatic change. Communities should also be living within reasonable and sustainable footprints whether they are carbon or ecological in nature. One important goal of the Charter and the EAP needs to make sure that a majority of City citizens actively support Eco-City initiatives. The EAP also needs a healthy number of community partnerships in order to take Eco City to the next stage. The EAP could more clearly articulate ways for nonprofit organizations within the city and region as well as private business and institutions to become more sustainable.

4.2.4 Implementations and Indicators

Implementation sections are present in both the EAP and the Charter. Each of those sections outlines in some detail the roles and responsibilities of the EPC, city staff, city leaders, and the community at large. As EAP implementation depends on the involvement of all sectors and potential stakeholders, it would be important to revisit these implementation sections to better understand who is missing and develop strategies to ensure broad buy in and engagement.

RECOMMENDATION: EPC and OEQ should carefully evaluate the implementation roles and responsibilities set forth in the Charter and EAP and develop a strategy for ensuring the various stakeholders understand their roles and will take a formal “pledge” to take on those responsibilities as set forth in those implementation sections.

As the OEQ and EPC begin the EAP update process it will be critical to have parallel discussions about more carefully aligning existing and new sustainability policy and program goals with more robust performance measures.²² By having baseline data and support for fair metrics and accountability, city officials can apply this new group of sustainability indicators as benchmarks and measuring tools to discern and replicate performance-based outcomes that translate into how

²¹ Alexandria City Public Schools’ 2015-2016 budget removed all funding for sustainability program coordinators at their schools. ACPS sustainability programs and coordinators were a substantial partner with EPC and the city. This action sends the wrong message to the city’s youth.

²² For a more thoughtful analysis on how the city can improve and enhance its annual Eco City progress report and ensure the city’s current environmental indicators more closely align with the new EAP goals and targets, see student policy brief by Jimena Pinzon.

the City understands how its sustainability programs and project align against the Charter’s vision and compare with competing municipalities. Alexandria needs new baseline data in order to benchmark and track new improvements. Alexandria must be able to financially account for both positive and negative ecological services through accurate metrics and indicators.

Current City efforts with GIS, the Socrata Dashboard, and the Office of Performance Management (OPM) are on their way towards expanding city capacity for tracking sustainability improvements. Refining the process in order to take into account the fact that beneficial indicators are objective, replicable, measurable, relevant, practical, and meaningful,²³ the City needs to set its sight on strenuously attainable goals set for future accomplishment, as this will help in developing indicators that match the criteria set forth.

4.2.5 City Hall Fragmentation

Based on conversations and meetings with the VT team, it appears that few City departments (other than T&ES and OEQ) regularly follow or use the EAP. Many city departments have their own public commissions or advisory boards that develop their own specialized “master plans” from solid waste to transportation. While the EAP does attempt to integrate and incorporate actions items and targets from other plans, it appears this cross referencing happens in only one direction. It was hard to find references to the EAP in these other “master plans.” This type of policy and planning fragmentation makes it difficult to implement cross cutting sustainability policies and projects, such as climate change, urban greening, etc.

From time to time OEQ convened other mid-level department managers to tackle cross-cutting policy and project tasks through its Environmental Working Group. A working group can provide a regular vehicle for information sharing and collaborative problem solving on specific issues. Certainly the city manager and his team also convene special working groups to address upcoming priority projects and policies. A standing Eco City working group would not only foster cross-departmental collaborative efforts, but could identify trends and problems before they become significant.

Unfortunately existing cross department coordination on Eco City activities and EAP is managed by existing OEQ staff who have other OEQ responsibilities. It’s hard to convene and facilitate such cross department work when one has other full time responsibilities **What the city needs is a full time, dedicated green champion (AKA sustainability coordinator) within city hall would do much to help the city in terms of organization and implementation.**²⁴ Other priorities for the green champion would be to monitor, enhance and promote City benchmarking indicators and metrics. Without a sustainability coordinator as the primary Eco City point of contact, many of the EAP’s goals and action steps will be difficult to achieve within the time frames necessary to move the city forward on its sustainability journey.

²³ Jimena Pinzon, Tracking, Indicators, and Report Cards, 6.

²⁴ See student policy brief on sustainability coordination and community by Chuck Egli.

4.3 Opportunities and Threats of the Eco-City Alexandria Initiative and EAP

Beyond the existing strengths and weaknesses of the EAP and the Eco-City Initiative, the OEQ and EPC must look forward to the trends that might present opportunities for expanding or institutionalizing Alexandria's Eco-City policies and programs as well as external threats that might make it difficult to accomplish the many actions set forth in the EAP. Sometimes a particular issue or challenge can pose both an opportunity and a threat. The next section of the SWOT analysis identifies a few of the possible **Opportunities and Threats** that can help City officials and the EPC start conversations that are critical and forward thinking in order to stay ahead of and mitigate emerging threats while seizing opportunities as they present themselves.

4.3.1 Fostering More Regional Eco City Cooperation and Partnerships

Sustainability issues from water resources to transportation have significant regional implications. While Alexandria can exert some influence over City operations and services and establish rules, policies and plans that have some degree of impact on its residents and businesses, the City should consider how it can establish stronger regional partnerships and linkages. In light of sustainability leadership of Arlington and Washington, D.C., Alexandria needs to take full advantage of local governments and regional NGOs that have taken significant sustainability actions, enacted sustainability plans, adopted community energy and aggressive green building policies or are willing to support progressive environmental stewardship. Alexandria City officials and staff have a great opportunity to learn from these efforts, as they can build on the growing ground swell and bring more green investment into the City. Forming green partnerships such as one with the Alexandria Emerging Technologies Center (AETC) could further facilitate the expansion of a more robust green business, technology and job sectors.

RECOMMENDATION: City of Alexandria should consider establishing formal relationships and informal partnership to foster more sustainability learning and cooperation across jurisdictional and organizational boundaries. Regional sustainability approaches become more pragmatic as Alexandria continues to grapple with dwindling revenues and resources for Eco-City and EAP programs and policies.

4.3.2 Hiring a Sustainability Coordinator

Perhaps the single most important opportunity for moving Eco-City and EAP forward would be the hiring a Sustainability Coordinator. More so now than ever before the EPC and the OEQ have consensus that a Sustainability Coordinator is critical to taking the Eco City Initiative to the next level but more importantly help revise and manage the entire EAP effort along with providing the vehicle for facilitating stronger cross departmental collaboration—all essential ingredients to making Alexandria a more livable and healthy sustainable community.

RECOMMENDATION: EPC should immediately engage local residents, policymakers and businesses in making the political and policy case for hiring a sustainability coordinator by the start of the next fiscal year (July 2016).

One of the major barriers to bringing a sustainability coordinator on board is the city's fiscal condition and the lack of dedicated financing streams. This can be abated by another currently important opportunity—adopting and collecting a Stormwater Utility Fee—that could be linked with Eco City Alexandria and support the sustainability coordinators position. By creating a dedicated funding stream to hire a Sustainability Coordinator, the City will be able to realize and accomplish more EAP action items. Other jurisdictions have funded their Sustainability Coordinators using grant or partnership funds, federal stimulus funding, and the money saved by enacting and utilizing policies and programs that promote energy and other intermediate and deep efficiency savings.²⁵

4.3.3 Exploring Opportunities for Sustainability Demonstration Projects and Eco Districts

Beyond the many planning, program and policy observations and recommendations within this report, city officials and EPC must also identify specific places for sustainability demonstration projects. **Pilot testing emerging sustainability technologies and concepts**, such as passive houses, distributive renewable energy, and Eco Districts, **gives everyone—city officials, businesses, and residents—the opportunity to experience (e.g., touch, see, understand, test, etc.) the potential of sustainability plans and policies.** For the most part, existing EAP actions focus primarily on city led policies and programs. While many of these city actions have tested a few novel sustainability approaches, such as green infrastructure and single stream recycling, they have not really explored close partnerships with the private sector and nongovernment organizations that deploy sustainability technologies at particular sites and locations.

With the recent creation of the Alexandria Emergency Technology Center (www.aetc.org) the community has new capacity for bringing together green investors and businesses for green demonstration projects.²⁶ Launching demonstration projects that address a variety of sustainability topics (from storm water to clean energy) will not only put Alexandria on the green industry map but it will serve to attract other like-minded entrepreneurs and organizations. The challenge for city officials and the EPC is how to nurture and cultivate this relatively untapped dimension of the City's Eco City Initiative.

RECOMMENDATION: City officials, including the city's economic development office, EPC, and AETC should convene a special internal workshop (maybe create a mayor or manager task force) on how to grow green investors and green businesses in Alexandria through a series of demonstration projects that could take place at different scales through the city.

RECOMMENDATION: EPC and OEQ should revisit and revise the Business Sustainability provisions of the Charter and the EAP's action items and align the new EAP more closely with the recent sustainability concepts of emerging in technologies and Eco Districts.

²⁵ Chuck Egli, Sustainability Coordination, and Communication and Outreach, 15-16.

²⁶ We also want to call attention to the pending demonstration project by the NGO [Chesapeake Crescent](#), however, it remains unclear at this time whether the project and technical assistant team they support will touch upon sustainability technology and green business—we hope it can create such synergy.

During the student presentations EPC members learned about Eco Districts and how more communities throughout the US (and globally) are developing special sustainability plans and policies at the neighborhood/district scale. **One of the ideas discussed at that EPC meeting and in the student policy brief on Eco Districts is making the Eisenhower Valley the epicenter for the city’s sustainability demonstration projects—essentially transforming the Valley into a green tech corridor.** While certainly there are other Alexandria neighborhoods and districts that lend themselves to Eco District principles and concepts (e.g., North Potomac Yard and the re-development of ‘Corridor B’), it seems the Eisenhower Valley presents the greatest potential in light of its existing tenants (e.g., National Science Foundation, Covanta, AlexRenew, etc.) and planning/land use and infrastructure for testing sustainability concepts such as urban agriculture, complete streets, district energy, and green infrastructure. Of all of the districts in Alexandria, the Eisenhower Valley could become a global living laboratory for a new generation of green business that would pilot test “disruptive technologies” within its urban and suburban scales.

RECOMMENDATION: The Planning Department should hosts and conduct a multi-day planning and design charrette to explore the feasibility of designating the entire Eisenhower Valley into a special Eco District Overlay Zone that could link and unify the applicable small area plans through various sustainability policies, programs, projects, and incentives.

4.3.4 Enhancing Community and Political Support

Where one finds opportunities threats also lie. The Charter and the EAP seem vulnerable without building a broader and more active community coalition of residents, policymakers and businesses. Even though the Charter and EAP have been in place for seven years, they still have not been fully integrated into mainstream Alexandria. In light of recent and past political changes, it would seem the ideal time for rebuilding a new political coalition to advance the Eco City agenda. Certainly there has been past political support to protect Eco City from budget cuts, but it remains unclear whether the new political leadership will have as much of an investment in Eco City.

RECOMMENDATION: EPC should hold a series of briefings (or prepare briefing materials) for new city officials (elected and/or appointed) or existing city officials taking to explain Eco City’s history and benefits, etc.

Another element in expanding community and political support is making the economic and fiscal case for garnering additional (ideally dedicated) resources for Eco City and the EAP update. Current resources allocated to Eco City and other green initiatives seem low compared with other high priority budgetary and program priorities, such as the police, fire and the schools. Without funding dedicated to promoting existing let alone new Eco-City initiatives, it will be difficult, if not impossible to accomplish the EAP’s existing action steps, let alone take on new policies and projects. As previously mentioned, funding is a threat that could torpedo most progress on accomplishing the goals set forth within the EAP. One way to address this threat is to develop the economic case for Eco City and the EAP actions by gathering data and documenting their socio-economic benefits.

4.3.5 Understanding Alexandria's Existing and Future Fiscal Health

Beyond the shifting political and community support for Eco-City and the EAP implementation, perhaps Eco City's greatest threat is the City's relatively flat fiscal condition. City staff have recounted that in each of the past six budgetary cycles many city departments and programs have faced budget reductions and/or declining staff. While no layoffs have occurred within the OEQ, they have not been able to quickly replace staff that have left or have transferred. How precarious is the EAP? Perhaps a good indicator is the city manager's postponement of the EAP update until the next fiscal year (2017) because of declining or stagnant revenues. While it is beyond the scope of this Eco-City SWOT analysis to explore in depth the long term fiscal challenges of the City, several promising ideas for how the City might fund or support the hiring of a sustainability coordinator can be found in the two student policy briefs, on sustainability coordination and financing.

The most immediate Eco City funding idea on the table is the City's renewed interest in imposing a Stormwater Utility Fee. Because of the tremendous capital investments that will be necessary over the next several years to comply with the conditions of the City's EPA Municipal Stormwater MS4 Permits, the City will need to identify dedicated resources for such a massive infrastructure undertaking. As other cities have done, diverting a small percentage (e.g., maybe 3 to 5 %) of the stormwater utility to fund general sustainability education, outreach, and the sustainability coordinator might make this important priority a reality.

4.3.6 Navigating Dillon's Rule and the Governor's Office

The legal limitations on local governments in the state of Virginia remain a constant threat and barrier to advancing sustainability policies and programs. Dillon's Rule of strict legal construction requires local governments to obtain authorizing legislation from the state for those policies and programs where there is not already a written state law or policy or where the proposed power cannot be reasonably inferred from existing written laws. This cumbersome legal doctrine plagues many local jurisdictions in Virginia causing them to hesitate in adopting progressive legislation.

Although Dillon's Rule and the state legislature as a whole do not seem very receptive to giving local government more authority to adopt sustainability policies and programs, the current Governor's Office does appear to have a strong interest in linking sustainability with green jobs and businesses. Alexandria should take advantage of this potential receptivity in the Governor's Office.

RECOMMENDATION: City officials should reach out to the Governor's office, perhaps convene a series of meetings with the Secretaries of Commerce, Natural Resources, and the City's Economic Development Office along with local organizations such as the AETC and other business interests in promoting the green economic agenda.

4.3.7 Acknowledging the Impending Regional and Local Realities of Climate Change

A final threat that city officials must take more seriously is the specter of dramatic environmental, economic and health consequences from changing climatic conditions. This single threat is the major precipice facing humanity, and is arguably the overriding concern behind updating, improving, and more aggressively implementing the EAP. EAP's action in one form or another have climate change implications. It is in Alexandria's best interest to understand what is happening and could happen at the regional and local levels and the best ways to mitigate the worst case scenarios while being resilient during the best case scenarios. Sea level rise estimates are also on the rise as some reports say as much as eleven feet of sea level rise by the end of this century is now a possibility.²⁷

As climatic conditions worsen, the frequency and duration of intense weather events will increase. Additionally, there will be increases associated with water velocity and contamination. These occurrences will be made worse with direct and indirect damage to infrastructure, including water treatment plants, transportation corridors, and other low-lying public and private interests that are in close proximity to bodies of water.²⁸ Given Alexandria's geographic and topographic conditions, post-disaster costs could devastate the City of Alexandria's fiscal and economic condition. Ecological and human health impacts of climatic change will additionally add socio-economic pressures to the City in its delivery of even the most basic services, as increased temperatures lead to a more conducive environment for vectors to thrive in.²⁹

4.4 SWOT Overall Conclusions

The City and EPC should consider this SWOT analysis as a preliminary effort to assess whether or not the Eco-City Charter and ensuing EAP are 1) Being utilized by the City, businesses and individuals; and 2) Benchmarking against other cities that have similar triple bottom line initiatives. This SWOT analysis can serve as a preliminary diagnosis of what is working and what needs improvement and thereby become a bridge to start conversations, convene meetings, foster collaboration, and take actions. Perhaps a good place for city officials to start is reviewing the roles and responsibilities set forth in the EAP's implementation section as it still clearly establishes a menu of critical actions, some which have been taken but others that demand infusion of more attention, commitment and resources.

Although Alexandria has already become a national leader in urban sustainability policy, the city's current challenge is whether it can become a national model of a sustainable community. The original EPC and concurrent City Council crafted and adopted a progressive and far reaching EAP because they envisioned a greener, prosperous, and healthier future for all Alexandrians. Alexandria has been able to launch many sustainability programs and projects by using the Charter

²⁷ AlJazeera, *Antarctic ice shelf could crumble, says NASA study*, May 15, 2015

<http://america.aljazeera.com/articles/2015/5/15/antarctic-ice-crumble.html> (accessed July 8, 2015).

²⁸ Zach Krohmal, *Climate Change, Preparation & Mitigation*, 3.

²⁹ Ibid., 4.

and the EAP as the framework for action. These two pioneering documents can still steer Alexandria into a more sustainable future. The current EPC and City Council can continue this legacy by recalibrating these documents consistent with the current state of urban sustainability. Since 2009 many cities have surpassed Alexandria's pioneering Eco City efforts. Now is the time to ensure the city once again is on the vanguard of urban sustainability.

5 Student Policy Recommendations

5.1 Overview

The following recommendations were developed by curating the most promising ideas from the student policy briefs. A few of these recommendations in this section have already been mentioned in the SWOT analysis but perhaps not with the same level of detail. The student policy briefs in most cases provide more information and examples from other cities.

The student recommendations are organized into two levels of priority:

- SIX immediate or high priority actions that can be/should be “done” from 2015-2017; and
- Several “transformative” priority actions that should be “done or started” between 2017-2020. Several of these priorities also include other sub recommendations for EPC and OQE to consider.

These recommendations have been selected from the more than 100 recommendations found in eight student policy briefs. Some of the recommendations are specific ideas the EPC and OEQ should consider for its 2016 update of the Environmental Action Plan (EAP) while others involve fundamental changes related to the broader Eco City Initiative. Several of the recommendations are reframed from the student papers so they more closely align with Alexandria's existing and especially future dynamics. The transformative recommendations are classified according to three criteria: 1) Cross Cutting Priorities; 2) Type of Action; and 3) Priority Level.

City Cross Cutting Priorities: As discussed earlier, the VT professor and students identified 8 cross cutting topics for the student policy briefs that involved two or more of the EAP and Eco City Charter's principles. They refined that list of 8 into three cross cutting themes:

- Urban Greening: establishing a more holistic policy and program framework that would link open space, green infrastructure, habitat/natural resources, urban forestry, and climate change strategies, etc. Alexandria's has some elements, such as the Urban Forestry Plan, Open Space Plan and Climate Action Plan, but could benefit from a comprehensive program and policy framework that would encourage broader use of a wide variety of urban greening techniques (e.g., green roofs, LID, green infrastructure) and provide ecosystem services with open space and habitat benefits.

- Green Buildings and Community Energy: adopting policies and programs that not only conserve energy (e.g., green building policies and programs) but also promote renewable energy sources, energy choice, and laying the foundation for more distributive energy infrastructure through community energy planning. Alexandria has some elements, such as its Green Building Policy and energy efficiency for city operations, but has few policies (other than the EAP) that links energy efficiency from GBP with regional or local energy generation from more renewable sources.
- Transportation, Land Use and Housing: creating a comprehensive policy framework, along with the tools (such as overlay zones, developer incentives, etc.) that strengthens the connections between these three individual Master Plan elements; Alexandria makes these connections in many of its SAPs, but does not have a city wide, long range planning lens which infuses smart growth and sustainability principles on housing, land development and transportation; these connections could in fact serve as the impetus for overhauling the city's Master Plan or at least updating its 1992 Land Use Element.

RECOMMENDATION: The EPC and OEQ, working with the City Manager and relevant department directors should formally adopt these three cross cutting themes as top policy and program priorities for the next 3 to 5 years; perhaps infuse them into current works plans for city manager and relevant city departments.

Action Type: while these recommendations cover a wide range of potential actions, the following four types of actions arose from the specific recommendations discussed in this report:

- Planning or Policy
- Process or Programs (internal actions within city hall)
- Partnerships and People (external actions with nonprofit, civic and private sectors and/or with the community)
- Projects to pilot test the proposed sustainability ideas

Unlike the content of the existing 2009 EAP, we did not discuss in this report longer term priorities, those that will likely take significant resources, major policy changes, and/or large community or civic commitments. Many of these more visionary ideas are discussed in the student briefs. For purposes of this report **we believe the city of Alexandria, its partners and its citizens can in fact take these actions (perhaps not complete them all) over a five year period.** Certainly some of them will require investments of political capital, new partnerships, the reallocation of existing resources and the development of new resources, but other US cities, several right here in Northern Virginia, have adopted many of the priorities list below—thus, Alexandria has the benefit of learning from their experiences.

5.2 High Priority Action Steps (2015-2017)

5.2.1 Recalibrating the EAP—ideas for the 2016 update and beyond...

Earlier in the SWOT Analysis the VT team offered general thoughts that relate to the format, structure, length and content for updating the EAP in 2016. Certainly this project started with the initial task of preparing the EPC and OEQ for the EAP update by providing policy briefs that focus on cross cutting sustainability policies and programs relevant for Alexandria and conducting the SWOT analysis. As the VT team gathered ideas from other cities, synthesized the latest developments in the field of urban sustainability, and met with city staff, EPC members, and representatives from regional/local nonprofits, it became clear that updating the EAP (using the same process, the same format, etc.) would be insufficient in order to elevate the EAP and Charter and infuse its principles and policies throughout the city.

Virginia Tech intentionally chose the subheading for this report—*Recalibrating the EAP*—which implies a more thoughtful, strategic, and potentially far reaching endeavor. City officials and staff may choose a more incremental path, but the discussion below offers several specific recommendations that Alexandria should take in the next two years as it moves forward with drafting and adopting a new EAP.

5.2.1.1 Consider multiple formats for the EAP.

As discussed in the SWOT Analysis OEQ and EPC use the EAP in different ways, so the next iteration should remain flexible and accommodate different and diverse audiences. Some staff feel the current EAP is too prescriptive and offers too many policy details. One idea to consider is to publish the EAP in different formats. Perhaps EPC can work with the city's communications staff to develop a publicly accessible executive summary that focuses on the city's most pressing sustainability challenges and highlights existing and upcoming initiatives? Certainly the annual OEQ update could undergo a "makeover" in terms of content and format. OEQ might develop more elaborate matrices that track internal actions taken by city departments, in fact, OEQ should work with the City Manager and the Office of Accountability to develop a simple on-line dashboard where all city departments could input their actions.

5.2.1.2 Develop an EAP Annual Action Agenda.

As EPC and OEQ prepare for the 2016 update they should carefully review the implementation sections of the Charter and EAP as it offers some ideas on how they can each leverage the flexibility of the EAP. For example, the EAP mentions that each year EPC should identify its top EAP priorities. Perhaps EPC can publicize these priorities, engage the community in workshops to get feedback, and then take actions to focus the attention of city leaders on these priorities. They could also use this exercise to more meaningfully engage other city commissions and departments. Certainly EPC and OEQ may not agree 100% on these priorities or the amount of attention they deserve, but that should not dissuade EPC from tackling this responsibility set forth in the EAP.

5.2.1.3 *Move the Long Range Goals and Actions.*

Another idea to help make the EAP more accessible and digestible is to limit the scope or timeframe of the EAP to a shorter period of time, say 3-5 years and move the longer term action steps and goals to a different document—one that could be more of a strategic plan that sets longer term goals and targets that EPC and OEQ could revisit every 2-3 years.

5.2.1.4 *Formalize the EAP within the City's Master Plan.*

In considering other alternative documents for the long range sustainability goals, a fundamental question arises about the relationship of the EAP to the city's Master Plan. As discussed earlier in this report, the current EAP is a Tier III document which has little legal and policy impact. Equally important, the current Master Plan does not contain environmental goals and objectives let alone sustainability policies except in some recent amendments to a handful of recent SAPs. **Thus, infusing the Master Plan with a new sustainability chapter that sets forth a series of mid-to-longer term sustainability goals, objectives, and targets would make the most sense from an urban planning perspective.** While updating the city's Master Plan is beyond OEQ's responsibilities (the city planning department would have to take the lead), it again provides another opportunity to address one of the major weakness of the city's Eco City Initiative—the lack of consistent cross department coordination on sustainability policies and programs. Although the city incrementally updates the Master Plan with changes to SAPs and various chapters from time to time, nearly 25 years have passed since the city did a comprehensive overhaul. Sustainability was just emerging as a new policy concept. Since 1992 hundred of local governments in the US have adopted sustainability comprehensive plans and policy plans. By adopting a new sustainability chapter to its Master Plan, Alexandria would once again be recognized as a sustainability pioneer within Virginia and beyond.

5.2.2 Upgrade OEQ's Sustainability Indicators and Progress Reports

In order for the City to track its sustainability progress, it must develop and implement a more robust set of goal and sustainability indicators. These mechanisms provide feedback loops to gauge and benchmark progress on a certain topic or action item. Like a speedometer in an automobile, the successful indicator provides information necessary to make informed decisions about how to proceed from that particular snapshot of time. These indicators must be set in conjunction with a manageable set of specific SMART goals within the new EAP and eventually someday across other city plans, even the city's Master Plan could have more performance based provisions in light of cutting edge development through the STAR Communities Rating System. There are many possible actions the City should take within the next two years. Below we offer several priority actions that should be taken in tandem with the next iteration of the EAP.

5.2.2.1 *Evaluate and reassess existing indicators.*

Before the EPC and OEQ establish new EAP goals and targets they should reassess the existing environmental indicators to determine if the results track meaningful outcomes and ensure the city can easily compile or gather the data. The student policy brief by Jimena Pinzon provide a solid set

of questions and frameworks for doing such an evaluation. OEQ and EPC should also ensure the city has sufficient capacity to measure/gather or obtain data to track the revised targets and goals over time.

5.2.2.2 Align new EAP SMART goals and targets with a revised set of sustainability indicators.

A critical step in recalibrating the EAP is to set SMART goals supported by measureable, sustainability indicators (not just environmental). As EPC and OEQ develops its list of innovative action steps for the next EAP, they should simultaneously develop measureable and specific indicators. Setting more robust and meaningful indicators also offers EPC and OEQ another avenue for engaging other city departments, the city manager's office and the Office of Performance Accountability.

5.2.3 Recalibrating the EPC Mission and Scope of Activities

EPC's current mission focuses on review of existing city policies and programs, suggesting changes, advocating for changes that will improve the city's environment, perhaps acting as an educator for city leaders, staff, and the community. In essence EPC remains the "environmental voice" or conscience of the city. Beyond its substantial investment in Earth Day, the EPC's current mission requires it to focus more on policy and less on implementing program actions.

RECOMMENDATIONS: The EPC should consider spending more time on launching and supporting other activities beyond Earth Day, especially in light of the lack of dedicated staff, resources and capacity. Perhaps refine and expand EPC's Mission to support more program and project activities, such as:

- *Recruit Eco-City Ambassadors from existing citizen and neighborhood associations, perhaps designate an Eco-City rep from each citizen association;*
- *Convene a meeting where all Ambassadors assemble to develop citizen-based activities that each neighborhood association could sponsor and lead;*
- *Hold a summit as an annual convening of Eco-City Ambassadors, and City and local leaders to increase the attractiveness of the Eco-City Brand and Earth Day festivities.*
- *Hold monthly events designed to create socializing and networking as a community – government platform for dialogue. Include ACPS and Eco-City Cafes.*

These are a few quick activities for the EPC to consider launching and supporting in the next 18 months. The EPC and its members likely have other activities that it could develop and adopt to expand the range and intensity of its Eco City agenda. Certainly some of these activities could then eventually be handed over to the Sustainability Coordinator once that person comes on board.

5.2.4 Create and Fund a Sustainability Coordinator (SC) Position

As discussed earlier in the SWOT analysis perhaps the single most important recommendation is for the creation of a SC position. The Coordinator would act as a champion and be in charge of Eco-City's communication and outreach programs and sustainability projects. This role would be able to pull from a plethora of dedicated funding strategies, as two-thirds of SC funding in other cities comes from special fees, foundation grants and partnerships and cost savings the SC position helped achieve in the first place.³⁰ A majority of the SC interviewed for this project were able to secure grants that in fund in part or in whole their position along with additional staff and projects. For Alexandria, perhaps the most promising sources of dedicated funding for the SC would be a stormwater utility fee the city is now reconsidering. Other cities, such as Santa Monica, California, dedicate a small percentage of their stormwater fee to cover the costs of their SC and support staff. Alexandria can also learn from the funding mix developed for the City of Richmond, Virginia's SC position and staff. The SC is needed in order to facilitate and shepherd many of the small yet important tasks that are set forth within the Charter and EAP. In the excellent student policy brief, Chuck Egli sets forth a number of alternative strategies for bringing the SC on board as well as priority action items that ideally could start as part of the fall 2016 EAP update:

- Convene a study visit of 3-4 SC from other cities in Virginia and Metro WDC to get their feedback directly on how best to create a SC in Alexandria
- Join national networks of SC, such as the Urban Sustainability Developers Network, that can provide technical assistance and peer learning
- Partner with local nonprofit organizations to give Alexandria greater capacity to achieve EAP action steps such as ACE in Arlington and the newly formed AETC in Alexandria.
- Convene a major annual awards ceremony celebrating local public, private, and nonprofit sector leaders—the movers and shakers of sustainability.
- Create and implement a sustainability communication plan.
- Upgrade websites / social media accounts to be more user friendly and aesthetically pleasing.
- Create a City mobile app that provides better access to public data and can help recruit Eco city volunteers and organizations.

5.2.5 Hire a Dedicated Sustainability Planner

Many of the High Priority and Shorter Term Recommendations set forth in this report involve infusing the latest in sustainability building practices and technologies throughout the city's residential commercial and office buildings. In order to ensure these new green building, design, and engineering policies and standards take hold in Alexandria and can flourish, the City will need additional technical capacity to review these specialized type of development proposals, make informed recommendations, and help the development industry, homeowners, and city officials

³⁰ Johnston, Sadhu Afochs, Steven S. Nicholas, and Julia Parzen, *The Guide to Greening Cities*, (Washington: Island Press, 2013), 156.

keep current with this rapidly evolving field. Many of these sustainability practices are performance based, thus it would be essential to have internal capacity to monitor their performance over time.

By the start of fiscal year 2017 (if not sooner) we would recommend the city hire a dedicated, certified sustainability planner who would review these plans and track their performance. They would not only review and monitor the city's newest suite of green building policies (as outlined in this report), but also other sustainability policies covering such topics as urban forestry, open space, green infrastructure, community energy, complete streets, etc. They could be a critical resource in updating SAPs with sustainability provisions and could take the lead with making the Eisenhower Valley a Green Innovations Park.

We understand city planning and building departments have adequate staff to review the city's current development and building requirements, but as the city adopts these and other green building standards and practices as proposed in this report and from the new EAP, it will be critical to have a dedicated planner (FTA) whose exclusive focus is on sustainability building, planning, and design standards. **Beyond plan and permit review, this position could also work in tandem with the sustainability coordinator on community outreach and perhaps convene special workshops with the regional and local development industry and Alexandria landlords and home owners.**

5.2.6 Convene a City Manager Cross Departmental Working Group on Sustainability

During the creation of the Charter and EAP, staff from OEQ convened mid-level city staff to get their insights, buy-in, and feedback to various drafts of the Charter and EAP. This Environmental Coordinating Group (ECG) has met periodically to address policies and programs that affect other departments outside of OEQ and T&ES. In order to elevate the Charter and EAP's holistic principles of "ecological sustainability," we recommend recasting the ECG so that it becomes a regular vehicle for cross department collaboration and coordination on a wider range of issues beyond just environmental policies and programs. In light of increasing daily work demands, we would recommend the city manager's office take on this natural role as the convener of a cross departmental working group. By having a deputy or assistant city manager facilitate the working group, department heads and their mid-level managers will take this effort to infuse sustainability throughout city operations, plans, and policies more seriously.

A good starting point for this new "sustainability working group" (SWG) would be focusing on the three cross cutting EAP themes identified above: 1) urban greening, 2) transportation, land use, and housing; and 3) green buildings, and community energy. The SWG could also be the appropriate place for having initial cross department discussions to overhaul the city's Master Plan and transforming the EAP into a Sustainability Chapter of a new, more holistic Master Plan. Once a sustainability coordinator comes on board he or she could in fact become the city managers point person for the SWG—yet another reason why any future coordinator should report to the city manager's office.

5.3 Transformative Recommendations (2017-2020)

5.3.1 Revise and Adopt a New Green Building Policy

The 2011 Virginia Uniform Statewide Building Code offers no prescription for green buildings, nor does it expressly give local jurisdictions the powers to enact or adopt Green Building Policies.³¹ Alexandria, like many Virginia municipalities, have adopted green building policies to encourage, incentivize, and facilitate the development of green buildings, but without state authority local jurisdiction cannot require developers to build green. Despite lacking the legal authority to “require” developers to build green (as they can do in the District of Columbia who has become recognized as an international leader in green building guidelines) Alexandria does seem to get its regional share of the green building development market.

While seeking state legislation, Alexandria should consider a series of revisions to its existing Green Building Policy (see preliminary list below) that would allow the City to provide additional incentives for developers of commercial and resident buildings to build green. These standards could also provide important baseline data about energy efficiency and usage as well as integrate other building/site level sustainability practices, such as low impact development and community energy systems.

- Revise the green building policy and implement and include one or multiple community scale design approaches to most or all new development in order to conform to net zero standards and 2030 carbon neutrality (choose from: LBC, Passive, Architecture 2030 etc.)
- Revise the green building policy to include other site and building sustainability practices, such as green roofs, low impact development, distractive/.distributive renewable energy systems (e.g. solar, wind, geothermal), etc.
- Develop special green building guidelines for retrofitting all existing buildings, including residences and buildings in historic districts.
- Create a SAP Sustainable Community Scale Design Template to be replicated in all SAP revisions. Dedicate SAPs as Eco-Districts or other comparable sustainability community.
- (LBC, Passive, and Architecture 2030) to capitalize on deep efficiency and or disruptive technology.

Beyond policies and regulations, Alexandria should also launch a series of demonstration pilot projects in collaborations with private sector developers and community based green nonprofits that can provide practical examples of cutting edge urban design and green building technologies. The Planning Department could also pilot these and other green building policies through special green development provisions in new SAPs that apply to single family homes. A new GBP would have great potential to then attract many new green jobs and green investment. Focusing on community scaled development would provide Alexandria with a Smart City that is resilient and

³¹ *Virginia Construction Code: Part I of the Virginia Uniform Statewide Building Code*, DHCD, Division of Building and Fire Regulation, 2009, <http://www.dhcd.virginia.gov/StateBuildingCodesandRegulations/PDFs/2009/Code%20-%20VCC.pdf> (accessed July 9, 2015).

have the ability to mitigate increasing effects of global climatic change. Priority recommendations could include:

5.3.2 Develop a New Community Energy Plan

Energy is a huge driver of economic growth that will become even more important as the nation and the world increase its share of renewable energy sources in light of global climate change and reduced reliance on fossil fuels. Local governments are leading the way in developing new types of community level energy systems. Resilient, smart energy grids at the district level will likely become the predominate power generating system in the near future. By Alexandria taking these and other short-range action, the city can also leverage these new community energy investments to develop green cluster economies and capture green startup companies that will provide local jobs and stimulate the local economy further. A new community energy plan could complement and expand the city's green building policies and programs to move beyond energy efficiency. The mid-range action items below can also help foster disruptive technology, save energy, and promote the sustainability agenda:

- Require all new buildings to incorporate alternative energy systems (e.g., wind, solar, geo-thermal), consistent with a newly adopted green building code.
- Implement a Lights Out Alexandria program.
- Consider Energy STAR Certification and provide monthly green building seminars in partnership with local businesses.
- Seek state legislation that would give local authority to adopt green building regulations, including living building guidelines and require energy efficient technologies such as smart metering technology and energy audits at time of sale or legal transfer.
- Solarize – look into a piloting of the Solarize Program in Alexandria that can test the boundaries of district energy and district water systems.³²
- Ensure that the North Potomac Yard, Eisenhower West, and GenOn Power Station site SAPs (and later all SAPs) develop in accordance with the greatest possible level of the adopted the GBPs and are consistent with the vision and principles of the Eco-City Charter and Environmental Action Plan.

5.3.3 Urban Greening

Urban Greening incorporates many different principles. These eight mid-range action items are necessary and need to be completed with three to five years. Most Urban Greening principles work cohesively are multi-faceted, and easily implemented. The simple planting of a native street tree, bought from a local tree bank vendor satisfies urban forestry and crown coverage goals, heat island mitigation goals, complete and living streets goals, invasive species prevention goals, supporting local business goals, cutting down on the City's carbon footprint goal, through ecological carbon sequestration and by buying locally vis-à-vis regionally, and urban design goals. Each of these

³² Note that in September, 2015 the City of Alexandria officially launched its [Solarize](#) program.

priority action items should help focus the EAP into developing a holistically designed policy document:

- Create an overlay zone encompassing the entire Green Crescent. Use this to formulate strategies on how to interconnect all City open space resources
- Adopt a Green Rooftops program and determine incentives.
- Expand urban forestry, and living streets training and programs to residents and designate more “Street Stewards” that are responsible for future maintenance of street trees, street furniture, street art, and reporting environmental degradation of natural and built systems.
- Develop a heat island (h.i.) and air quality heat map of the city by using LANDSAT data. Designate heat island overlay-zones and incentivize private h.i. mitigation measures including tree plantings, reflective and green roofing concepts. Increase percentage of canopy coverage within h.i. overlay-zones by 5-10%. Develop an air conditioning / HVAC payment assistance program. (During long-range could provide district geo-thermal power to help assist in cooling).
- Develop canopy goals based on zoning and integrate shade and multi-use trees with storm water infrastructure.
- Establish a tree bank with urban friendly trees for Alexandria’s future climate.
- Prioritize all City plantings with native plant species through local city vendors. Determine if current native species definitions need to be adjusted in the future. Create succinct education and management programs to teach and guide residents as to why and how to remove invasive species.
- Continue to cooperate with neighboring jurisdictions and the local public on flood management issues and explore ways to provide better structural flood mitigation.
- Develop wetlands and Eco-City lesson plans for City schools and provide and inform the public of flood risk through documents and workshops.
- Develop or revise Alexandria’s Landscaping Code in order to provide harmonious canopy and h.i. mitigation goals.

5.3.4 Transportation, Land Use and Housing

Transportation, land use and housing are all intensely interconnected, influencing each other. When the future revolves less around the automobile, more focus is put on democratizing the streets. All three elements are included when the City builds compact, mixed-use and mixed-income TOD that allows people to choose between transit modes and creates a truly walkable neighborhood. Completing each of these action items is achievable by 2020, yet they will require dedicated attention and planning:

- Adopt a DRPM pilot program similar to the goBerkeley program and assess future feasibility.
- Amend ECC and EAP to include an Affordable Housing Principle that corresponds to the HMP, and is inclusive of Green Building principles and the built environment recommendations of adopting a building policy. A second alternative would be to include affordable housing under the Land Use and Open Space principles in the EAP.

- Adopt City design standards and guidelines that require all new and repaired streets to become ‘Living Streets’ after construction.
- Establish a clear link between housing, transit and sustainable design and research and find a clear linkage between costs and benefits through the financing of sustainability within these directives.
- Create a TOD overlay zone encapsulating Corridor B and ensure development is walkable and transit oriented.
- Update the Bicycle Facilities Master Plan, and City bike and trail maps. Conduct feasibility studies for new links, trails and networks that would connect all-of-the City’s open space and historic infrastructure. Promote Bicycle Trains and specific “Bicycle Only” days.

6 Reflections and Concluding Remarks

Alexandria City government and its residents stand at the sustainability crossroads. Some may be content with the current pace of steady progress, while others demand stronger and swifter action in light of the urgent sustainability challenges that lie ahead. When the mayor and council unanimously adopted the Eco-City Charter nearly seven years ago they sent Alexandria down the pathway of sustainability from which it cannot turn back. Although the City has accomplished much during these formative years of its *Eco-City Initiative*, more work remains to be done. The next 12 months will be pivotal for the City of Alexandria. The city and its residents have a strategic opportunity to reaffirm their commitments as expressly set forth in the Charter and EAP and launch the second phase of Alexandria’s sustainability journey.

As it did during the process of developing the Charter and EAP, Virginia Tech, through this report and its engagements with city officials and staff over the past 9 months, has provided Alexandria with a roadmap for taking *Eco-City Alexandria* to scale. Separate from the more specific student policy briefs, this final report contains nearly 40 policy and programmatic recommendations that cover a wide range of topics (See Appendix 7.5 for a Matrix of Report Recommendations). Roughly half of these recommendations cover actions the City and EPC could adopt within the next 1-2 years—by the end of fiscal year 2017.

Each of these recommendations includes a call for action by city officials, such as the mayor, council, city manager, EPC, city staff along with its nonprofit and private sector partners. Alexandria cannot become a sustainable city without such partnerships—a core theme infused throughout the Charter and EAP. Each of the recommendations in this report came about after careful review of the existing EAP, Charter and other policy and planning documents and then refined and expanded through meetings with city officials, staff and EPC members to get their “on the ground” thoughts and experiences.

In light of the emerging community of practice around local government sustainability, our hope is city leaders will use these recommendations as their touch stone in reaffirming their commitments to the Charter and also in redrafting a new EAP that will once again put Alexandria back on the national sustainability map.

7 Inventory of Appendices

As part of the synthesis for this Final Report Virginia Tech conducted additional research and analysis that can be found on line at the Metropolitan Institute's Sustainability Planning Lab website (www.sustainabilityplanninglab.com). Look for the Eco City EAP 2015 tabs.

Below is an inventory of those appendices referenced throughout this report:

7.1 City of Alexandria's Planning Landscape

7.2 Northern Virginia Comprehensive Plans and Regional Plans

7.3 Northern Virginia Comparative Comp Plan Analysis and Matrix

7.4 Ecological and Carbon Footprint Analysis

7.5 Index of Policy and Program Recommendations